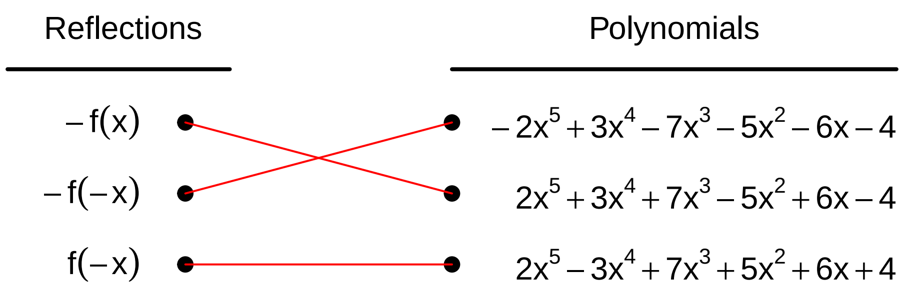
Name: Date:

Exam: Function Reflections (Solution version 22)

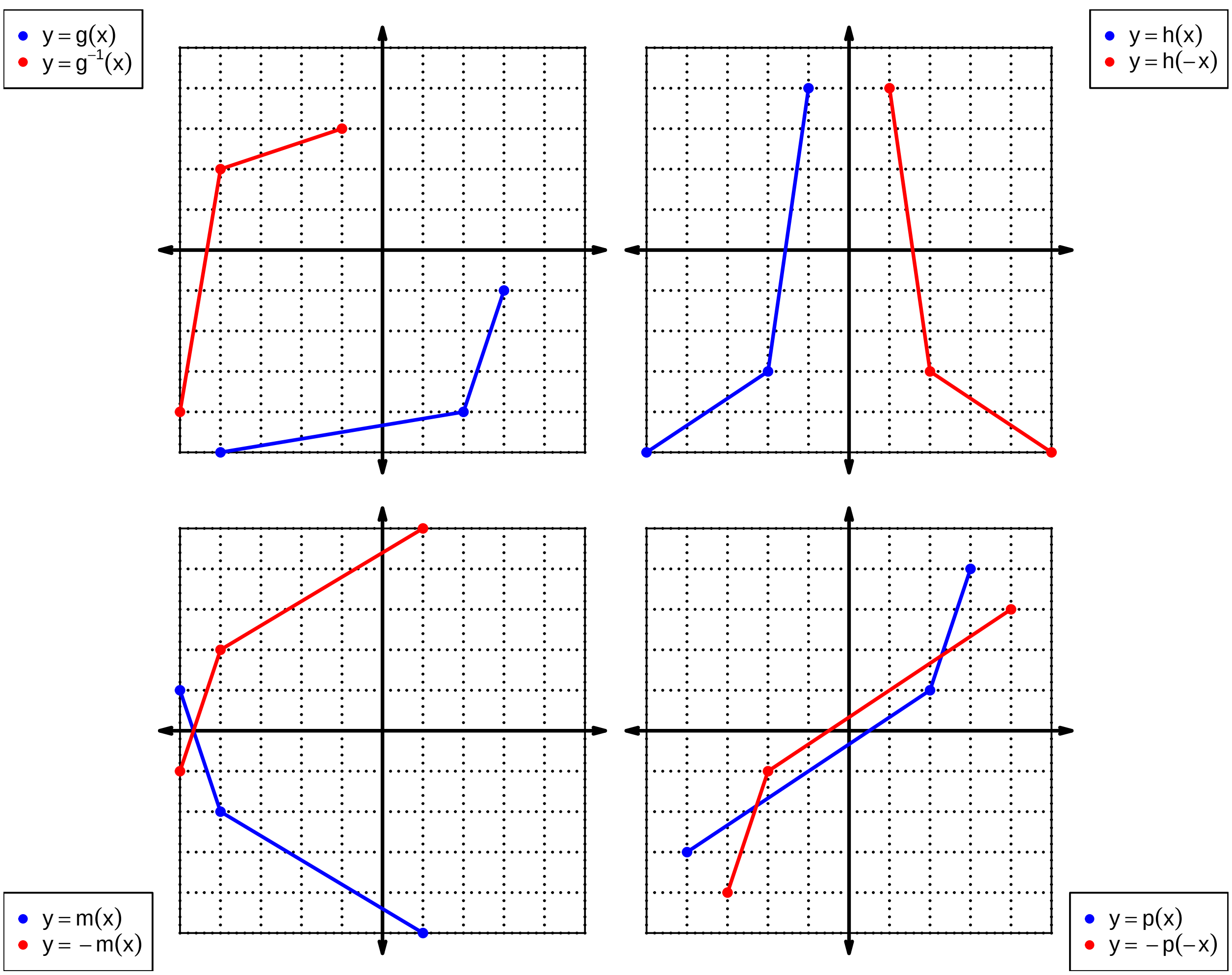
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; -2x^5 - 3x^4 - 7x^3 + 5x^2 - 6x + 4$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	8	7	5
2	9	9	4
3	5	2	1
4	1	6	8
5	7	4	6
6	3	8	3
7	6	5	2
8	2	3	9
9	4	1	7

3. Evaluate $f(4)$.

$$f(4) = 1$$

4. Evaluate $g^{-1}(3)$.

$$g^{-1}(3) = 8$$

5. By filling more rows of the table, it is possible to make function f **odd**. If that were done, what would be the value of $f(-2)$?

If function f is odd, then

$$f(-2) = -9$$

6. By filling more rows of the table, it is possible to make function h **even**. If that were done, what would be the value of $h(-9)$?

If function h is even, then

$$h(-9) = 7$$

Exam: Function Reflections (Solution version 22)

7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \; = \; x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) &= (-x)^3 + (-x) \\ p(-x) &= -x^3 - x \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) &= -\left(-x^3 - x\right) \\ -p(-x) &= x^3 + x \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

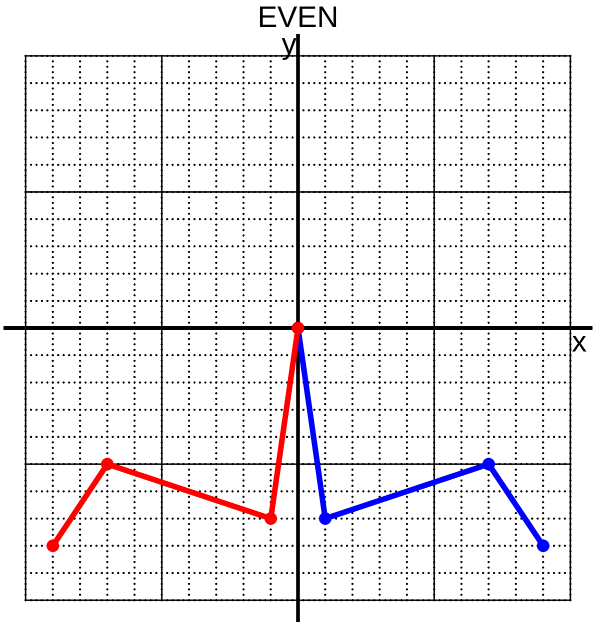
   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

Exam: Function Reflections (Solution version 22)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{5} + 3$$

a. Evaluate $f(50)$.

step 1: divide by 5
step 2: add 3

$$f(50) = \frac{(50)}{5} + 3$$
$$f(50) = 13$$

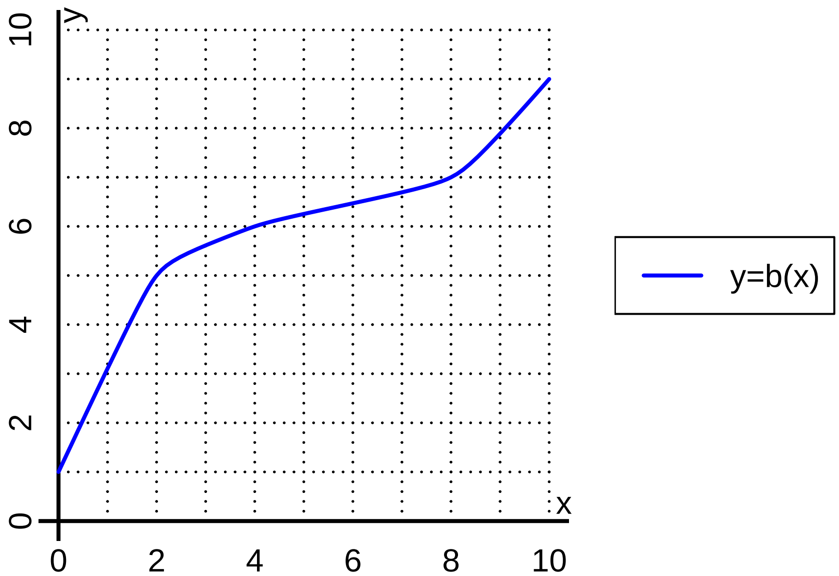
b. Evaluate $f^{-1}(12)$.

step 1: subtract 3
step 2: multiply by 5

$$f^{-1}(x) = 5(x-3)$$
$$f^{-1}(12) = 5((12)-3)$$
$$f^{-1}(12) = 45$$

Exam: Function Reflections (Solution version 22)

10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(4)$.

$$b(4) \;=\; 6$$

b. Evaluate $b^{-1}(5)$.

$$b^{-1}(5) \;=\; 2$$

Exam: Function Reflections (Solution version 22)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	3	-3	-3	3
-1	7	-7	7	-7
0	0	0	0	0
1	7	-7	7	-7
2	-3	3	3	-3

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.